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Sector-based explanation of vertical integration in distribution systems; Evidence from France

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Abstract:

Based on recent data concerning the French distribution networks in retail and services, this paper highlights several stylized facts relating to the sector-based differences in the organizational choices. Until now this issue has not been studied in the economical literature. This paper provides an analytical framework derived from the theory of contracts, and evidence for the French case.

Keywords:
Distribution Networks. Vertical relationships. Contract theory. Applied Econometrics.

JEL Classification Numbers: C12; L14.

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I. Introduction

The issue of sector-based differences in the organization of distribution networks was raised in one of the first empirical investigations dealing with franchising: Caves and Murphy (1976)'s seminal article. Yet this remains a marginal issue within the vast econometrical literature on franchising data. However, distribution networks, as franchise systems, concern a diversity of retail sectors.

Recent empirical works of the French National Institute of Statistics and Economic Studies (INSEE) highlight main sector-based differences in the organization of networks concerning the level of vertical integration (X. Reif, G. Solard, 2009 ; B. Mura, 2010). A network relates to a network of downstream firms using the brand-name of an upstream one. Several types of contracts involving more or less integration may organize the vertical relationship. According to the dominant type of contract, different kinds of chains can be distinguished. In addition, a mix of vertical relationships may occur within the same network.

Three stylized facts concerning the French distribution systems are at the roots of this paper: i) sector-based differences relating to the level of vertical integration, ii) a sector specific type of dominant contract, iii) three main organizational forms: groupments, franchised networks, integrated networks.

As with franchising and integrated networks, the units of a groupment share a same brand, but the vertical relationships are based on centralized purchases of the downstream units. With franchising the upstream firm transmits his business format and monitors the downstream units to maintain the network reputation. Integrated networks involve managers for the retail units instead of independent business owners as with groupments and franchised networks.

The purpose of this paper is to answer the following question: why is the integration level different amongst sectors? The integration level is studied in two ways: i) taken into account the fact that some vertical contracts involve more integration than the others, and ii) considering the part of owned units in networks. In other words, the driving question of this paper is as follows: is the Economic analysis able to explain the sector-based differences concerning the organization of distribution networks; or do these divergences have other kinds of explanations (historical, legal…)?

The originality of our empirical investigation relies on the sector-based approach, the focus on distribution networks and not only on franchising networks, and a unique dataset gathering recent and good quality primary French data from the INSEE.

The paper is organized as follows: section 2 highlights the stylized facts on French data. Section 3 surveys the economic explanations of dual distribution and of vertical integration in distribution systems in order to derive some testable propositions relating to the sector-based differences. Section 4 presents the sample and empirical specifications. The estimations are contained in sections 5. Section 6 concludes.

II. Stylized facts

The INSEE has conducted several surveys that collect information on networks composed of seven or more retail or services outlets. These surveys highlight the heterogeneity of retail trade and service activity sectors. These sectors differ on the importance of networks, the dominant organizational forms, and the level of vertical integration… In 2007, the survey dataset is made of 1 594 networks in the retail trade sector and the service activity sector. These networks are composed of 170 500 outlets.

II.1 Three main organizational forms in the French distribution systems

The outlets and the upstream firm can be linked by different kinds of relationship (*table 1 and appendix*). In the most common one, the outlets belong to the upstream firm or to one of its subsidiaries (37 % of outlets in networks). The second organizational form is the franchise (23 % of outlets in networks). In the third one, the outlets are members of a groupment (17 % of outlets in networks). The outlets linked by one of these three organizational forms realized 92 % of the turnover of networks (respectively 56 %, 11 % and 25 %). The other kinds of relationship are rather uncommon. These are: brand licence (10 % of outlets in network), concession (5%), affiliation and commission-based affiliation (3 %), and lease-management (1 %). In 2007, these organizational forms represent only 8 % of the turnover of networks.

Table 1- Relationship between outlet and upstream firm

Relationship between outlet and upstream firm	Number of outlets	Turnover (million euros)
Integrated	62 896	200 319
Franchise	39 267	37 730
Groupment	28 333	87 084
Brand Licence	17 029	8 717
Concession	8 819	7 744
Affiliation	5 506	3 092
Commission-based affiliation	4 784	4 030
Other	2 070	1 383
Lease-management	1 785	3 218
Total	170 488	353 318

Data from INSEE surveys on retail networks 2006-2007, INSEE survey on service networks 2008.

More than half (53 %) of networks are linked by the same relationship with all of their outlets. The other networks mix several kinds of relationship. For instance, franchising networks have to mix integrated and franchising outlets to abide by the law.

We classify networks in nine different categories according to the different relationships which exist in each network (*appendix*). 529 networks are completely integrated and 266 networks are predominantly integrated (*table 2*). These two kinds of networks realized more than the half turnover of networks.

There are comparatively few groupments (143 networks only), but they represent 25 % of the turnover of networks, in particular because they are large networks (245 outlets on average by network). In opposition, franchising networks are more common - they represent 28 % of networks - but realize only 15 % of the turnover. Franchising networks consist in 323 mixed highly franchised networks and 123 mixed lightly franchised networks.

Table 2- Relationship between outlet and upstream firm

Kind of network	**Number of networks**	**Number of outlets**			**Turnover (million euros)**		
		Total	**Mean by network**	**%**	**Total**	**Mean by network**	**%**
Completely integrated	529	34 824	66	20	103 994	197	29
Mixed highly franchised	323	35 012	109	21	25 126	78	7
Predominantly integrated	266	23 306	88	14	82 565	311	23
Groupment	143	35 106	245	21	89 830	628	25
Mixed lightly franchised	123	13 314	109	8	28 874	236	8
Brand Licence	68	9 951	147	6	7 806	115	2
Other	62	8 634	139	5	5 990	97	2
Concession	57	7 350	130	4	7 199	127	2
Commission-based affiliation	25	2 991	120	2	1 933	78	1
Total	1 594	170 488	107	100	353 318	222	100

Data from INSEE surveys on retail networks 2006-2007, INSEE survey on service networks 2008.

II.2 Sector-based differences relating to the size of the networks

The importance and the size of networks depend on the sector (*table 3*). The number of networks fluctuates between 7 and 319 among sectors; the average number of outlets by network is included between 27 and 377. A few sectors (in particular, clothes stores and home equipment stores) consist in a lot of small networks, whereas other ones (small and large-scale food retailing stores) consist in a few small networks. Organizational forms in networks are less present in other sectors (low number of networks and low number of outlets by network).

Table 3 - Networks and their outlets by sector (23 sectors)

Sector		Number of networks	Outlets		Turnovers (million euros)	
			Total	Mean by network	Total	Mean by network
Service	Accommodation	47	5 024	107	6 342	135
	Food and beverage service activities	88	5 129	58	7 401	84
	Travel agencies	29	2 887	100	4 596	158
	Other services activities	19	2 793	147	2 239	118
	Real estate agencies	53	7 420	140	2 526	48
	Renting (motor vehicles, personal goods)	23	4 282	186	2 907	126
	Information technology and computer service activities	14	380	27	143	10
	Other business service activities	79	8 809	112	23 527	298
	Personal service activities	97	7 444	77	1 993	21
Retail	Maintenance and repair of motor vehicles and sale of motor vehicle parts and accessories	26	5 783	222	7 453	287
	Large-scale food retailing stores	35	12 058	345	155 971	4 456
	Personal and household goods (except clothes and shoes)	127	18 877	149	13 017	102
	Cultural and recreation goods stores	78	8 067	103	14 041	180
	Home equipment stores	148	12 872	87	29 239	198
	Do-it-yourself stores and flower stores	80	16 061	201	32 756	409
	Department and general stores	14	956	68	5 370	384
	Small-scale food retailing stores and frozen products stores	24	9 050	377	9 718	405
	Retailing craft industry	25	4 174	167	619	25
	Sale, maintenance and repair of motorcycles	7	277	40	163	23
	Retail sale of food, beverages and tobacco in specialized stores	69	4 433	64	2 207	32
	Other sundry specialized retail sale	107	6 838	64	6 118	57
	Clothes stores	319	22 023	69	20 949	66
	Shoe stores	86	4 851	56	4 024	47
Total		1 594	170 488	107	353 318	222

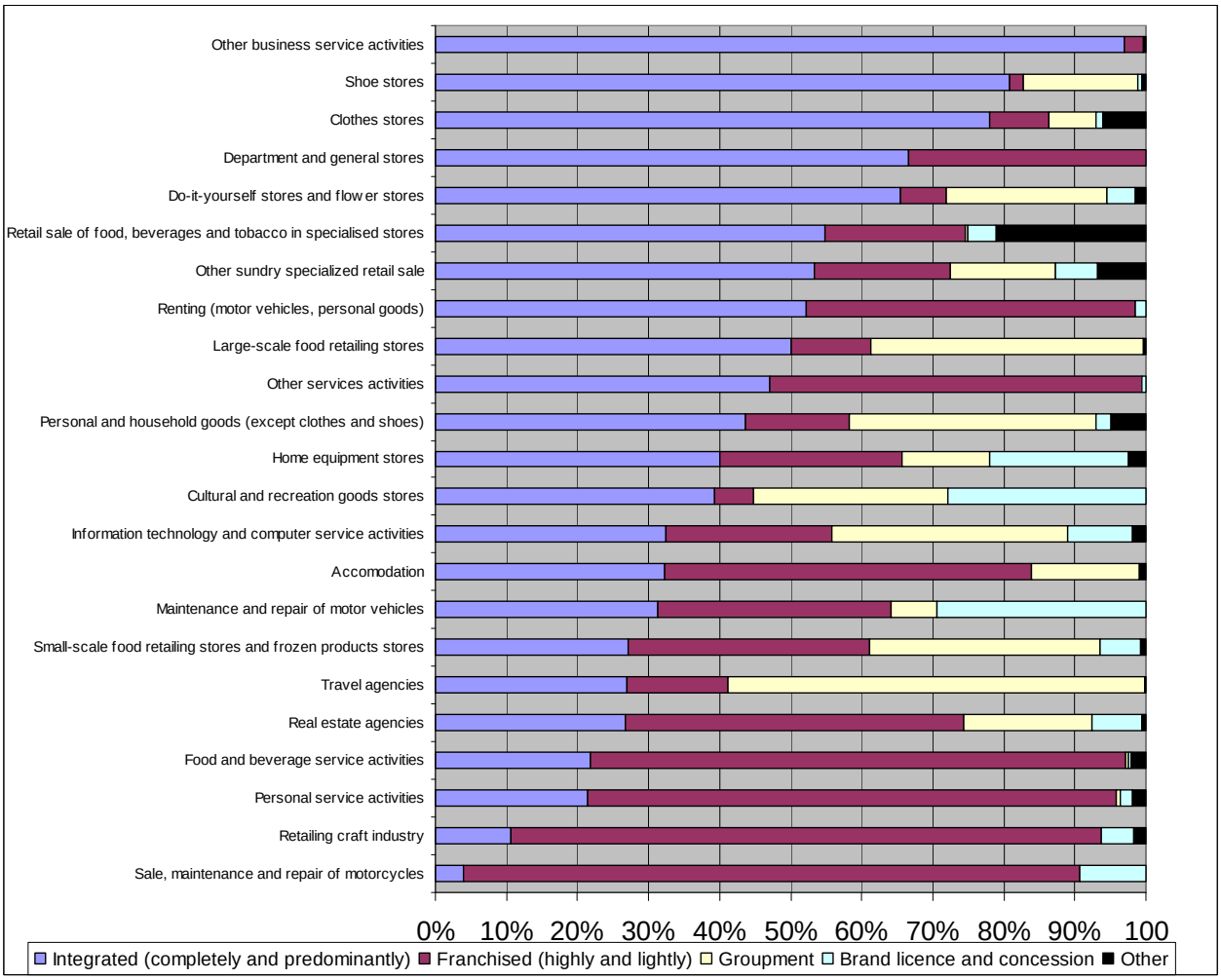
Data from INSEE surveys on retail networks 2006-2007, INSEE survey on service networks 2008.

II.3 A sector specific type of dominant organizational forms

Each organizational form does not develop itself equally in the different sectors (*graph 1*). First of all, completely and predominantly integrated networks realize more than 20 % of the turnover of networks in all the sectors except two: “sale, maintenance and repair of motorcycles” and “retailing craft industry”. They represent more than 80 % of networks in two other sectors: “Shoe stores” and “other business service activities”.

The share of franchising is generally higher in the service sectors than in the retail sectors: this share exceeds 20 % in 7 of the 9 service sectors but in only 6 of the 14 retail sectors. Conversely, groupments are more present in the retail sectors. The share of groupments exceeds 20 % in 7 sectors. This share is even quite high in the small and large food retailing sector and is near 60 % in the travel agency sector. Thus, sectors are not composed of networks having the same organizational form. Nevertheless, in each sector there is only a few different forms, one or two of which are predominant.

Graph 1- Distribution of turnover by kind of networks and sectors



Data from INSEE surveys on retail networks 2006-2007, INSEE survey on service networks 2008.

II.4 Sector-based differences relating to the level of vertical integration

This diversity is also obvious in the level of vertical integration of each network. The level of vertical integration is measured here by the share of turnover realized by integrated outlets (*table 4*). Only 22 % of networks have no integrated outlets. For instance, groupments are mostly composed of only one kind of organizational form. The level of vertical integration fluctuates among networks and sector. In one half of the networks, more than 65 % of the turnover is realized by integrated outlets.

The median share of turnover realized by integrated outlets is generally lower in the service sectors than the median for all the networks (except for travel agencies). This median fluctuates a lot among retail sectors: it is over 90 % for a few activities (clothes and shoe stores for instance) and it is under 20 % for other ones (Small-scale food retailing stores and frozen products stores).

Table 4 - Level of vertical integration by sector (23 sectors)

Sector	Level of vertical integration			
	First quartile	Median	Third quartile	Standard déviation
Shoe stores	80%	100%	100%	28%
Department and general stores	74%	100%	100%	31%
Personal service activities	1%	10%	41%	37%
Other services activities	5%	60%	80%	39%
Clothes stores	56%	92%	100%	40%
Retailing craft industry	10%	48%	88%	41%
Renting (motor vehicles, personal goods)	10%	40%	90%	43%
Travel agencies	63%	100%	100%	44%
Information technology and computer service activities	0%	11%	70%	45%
Food and beverage service activities	12%	63%	99%	46%
Home equipment stores	0%	10%	96%	46%
Personal and household goods (except clothes and shoes)	0%	62%	100%	47%
Other sundry specialized retail sale	24%	89%	100%	47%
Accommodation	0%	55%	85%	48%
Other business service activities	0%	38%	100%	48%
Cultural and recreation goods stores	0%	28%	100%	48%
Do-it-yourself stores and flower stores	0%	21%	100%	48%
Sale, maintenance and repair of motorcycles	0%	0%	55%	48%
Maintenance and repair of motor vehicles and sale of motor vehicle parts and accessories	0%	42%	100%	49%
Large-scale food retailing stores	0%	83%	100%	49%
Small-scale food retailing stores and frozen products stores	0%	0%	97%	49%
Real estate agencies	0%	15%	100%	52%
Retail sale of food, beverages and tobacco in specialized stores	7%	57%	100%	52%
Total	4%	65%	100%	48%

Data from INSEE surveys on retail networks 2006-2007, INSEE survey on service networks 2008.

III. Analytical framework and hypotheses

The survey of the literature in the framework of contract theory highlights three kinds of explanations for vertical integration within distribution networks that may be useful to explain the sector-based differences.

The integration level of a network can be seen i) as transitory (capital constraint theory, signal theory), ii) as the result of localized decisions concerning the downstream units (unilateral moral-hazard theory), iii) as the result of a global strategy from the upstream (transaction cost theory, multitask model, two-sided moral hazard model).

III.1 Contract-mix and network integration level as transitory

Since Caves and Murphy (1976), capital constraint is a main argument to explain franchising versus owning, or in other words to explain the development of non-fully integrated distribution networks. The downstream units are seen as financial and human capital providers enabling a fast and wide development of the network. In this framework, the choice to exploit a brand name through independent retailers instead of owned units would be due to the lack of maturity of the upstream firm. This explanation involves that the chain would become more and more integrated with maturity.

The mix of vertical contracts within a distribution network is also considered as transitory in the theory of signal based, concerning franchising, on Gallini and Lutz (1992)'s model. In the context of an information asymmetry relating to the value of the upstream firm's brand name, the franchisor may operate directly some downstream units. It is a way to signal the brand name value, being involved in its exploitation. With maturity, the chain reputation gets stronger and owned units are less required. Here again, the mix of vertical contracts and the network integration level is seen as transitory, but the evolution would be reverse to the one expected with the explanation in terms of capital constraint: with maturity the chain would be less integrated.

Whatever the evolution, in these kinds of explanations the mix of vertical contracts is just transitory in the chain development, and the level of integration at a given time reflects the maturity of the network.

Two hypotheses relating to the sector-based differences result from this framework:

H1: The integration level differs because the sectors do not have the same maturity

H2: The integration level differs because the sectors do not have the same constraints

III.2 Contract-mix and network integration level as the result of localized decisions

The unilateral principal-agent model offers another explanation of contract-mix and integration level in distribution chains. This explanation is rooted in the theoretical foundations relating to vertical restraints (Mathewson and Winter 1984, 1985; Rey and Tirole 1986). It finds an empirical support in the econometrical literature on franchising data (initially: Brickley 1999, Bercovitz 2000, Arrunada et al., 2001; more recently: Barthélémy, 2011).

The bilateral vertical relationship within a distribution network involves a moral hazard relating to a potential opportunistic behavior on the downstream side. The retailers of a distribution network share the same brand name. This involves a potential free-riding on the promotional effort. For each new retailer, the upstream firm faces a choice about the way it will expand the network: owned unit versus independent retailer with a vertical contract as franchising. This choice reflects a trade-off between incentive and control. In the moral hazard situation, higher incentives come from independent retailers, but better control is possible with integrated units. The upstream choice concerning each downstream unit is motivated by the local conditions regarding the monitoring costs and the level of the potential free-riding. Therefore, in this framework, the integration level of the network at some point is just the result of the aggregation of localized decisions. The heterogeneity of the local conditions involves the heterogeneity of the vertical contracts in the chain.

The introduction of a sector-based dimension in this analytical framework justifies the following hypothesis:

H3: The integration level differs because the sectors are more or less composed of heterogeneous local conditions

III.3 Contract-mix and network integration as the result of a global strategy

A third explanation of contract-mix and integration level within the distribution networks is based on the transaction costs theory and on more complex principal-agent models, with two sided-moral hazard or multi-tasks agents. This explanation draws attention to the complementarities between owned units and independent retailers in the network.

The transaction costs theory highlights the role of specific assets as a key determinant of integration. As reminded by Lafontaine and Slade (2010) in their survey relating to the analysis of distribution contracts in the framework of this theory, within a network the brand name is the main specific asset from the upstream firm.

This input is taken into account in the explanation in terms of two-sided moral-hazard. According to Scott (1995) the presence of owned units in the network is an incentive mechanism for the upstream

firm to invest in the brand name, as for the royalty rate. The higher the proportion of owned units in the network is, the more the upstream firm is incited to maintain the network reputation, because it is directly involved. Considering that the networks with a strong brand name capital have a higher level of integration (rate of owned units), Lafontaine and Shaw (2005) analyze the operating of owned units as a way to better control the retailers regarding the potential degradation of the brand name.

Bai and Tao (2000) adapt the Holmstrom and Milgrom (1991)'s multitasks model to study retailing as a two tasks activity requiring i) an effort to maintain the brand name value and ii) an effort to sale. In this context the coexistence of owned units and independent retailers in the same network is considered as a strategy of the upstream firm.

In this framework, a sector-based approach involves the following hypothesis:

H4: The integration level differs because the involvement of the upstream firm is different among sectors

IV. Sample and empirical specifications

IV.1 The sample

The sample consists of the 1075 networks in the three main organizational forms: integrated networks, franchised networks and groupments (*graph 2*). The distribution of these networks in the 23 sectors is presented in *table 5*.

Graph 2- Distribution of the three organizational forms in the sample

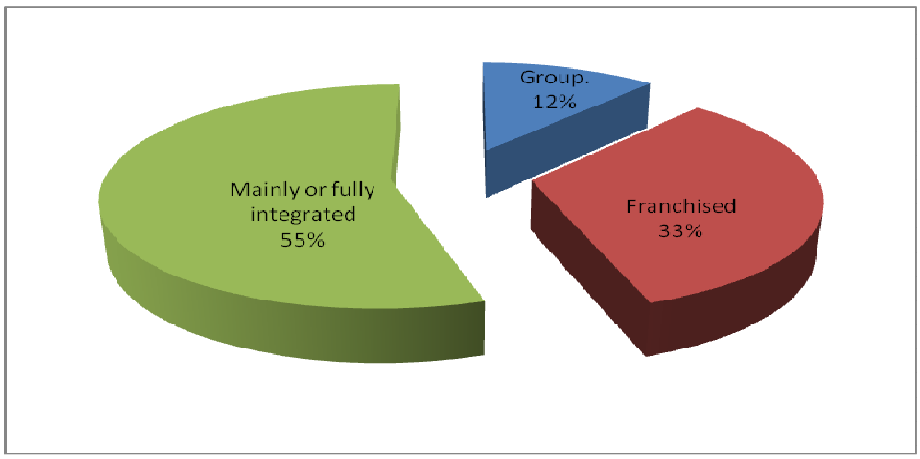


Table 5- 1075 networks, 23 sectors

Sector	Number of networks	% in sample	Type of PRODUCT	RETAIL/SERVICE
Accommodation	32	3.0	Anomal	Service
Food and beverage service activities	62	5.8	Banal	Service
Travel agencies	20	1.9	Anomal	Service
Other services activities	16	1.5	Anomal	Service
Real estate agencies	31	2.9	Anomal	Service
Renting (motor vehicles, personal goods)	18	1.7	Anomal	Service
Information technology and computer service activities	7	0.7	Anomal	Service
Other business service activities	59	5.5	Anomal	Service
Maintenance and repair of motor vehicles and sale of motor vehicle parts and accessories	17	1.6	Anomal	Retail
Large-scale food retailing stores	29	2.7	Banal	Retail
Personal service activities	63	5.9	Banal	Service
Personal and household goods (except clothes and shoes)	99	9.2	Anomal	Retail
Cultural and recreation goods stores	62	5.8	Anomal	Retail
Home equipment stores	84	7.8	Anomal	Retail
Do-it-yourself stores and flower stores	65	6.0	Banal	Retail
Department and general stores	12	1.1	Anomal	Retail
Small-scale food retailing stores and frozen products stores	20	1.9	Banal	Retail
Retailing craft industry	17	1.6	Banal	Retail
Sale, maintenance and repair of motorcycles	5	0.5	Anomal	Retail
Retail sale of food, beverages and tobacco in specialized stores	40	3.7	Banal	Retail
Other sundry specialized retail sale	70	6.5	Anomal	Retail
Clothes stores	177	16.5	Banal	Retail
Shoe stores	70	6.5	Banal	Retail

IV.2 Dependent variables

Three variables are taken into account to study the networks organizational choices: the integration rate, the choice for an integrated network, and the dominant type of organization. These variables are defined in table 6.

Table 6 - Three dependent variables

Variable	Definition	Type
OWNEDRATE	Integration rate of the network : Turnover of the owned units / Total turnover of the network	Quantitative variable
INTEGRETED	Choice for an integrated network: Mainly or fully integrated network versus groupments and franchised networks	Dummy variable
NETYPE	Dominant type of organization : groupment, franchised network, integrated network	Ordered multinomial variable

IV.3. Core explanatory variables

Table 7 presents the explanatory variables derived from the analytical framework.

Table 7 - Definition and summary statistics for the core explanatory variables

Variable	Definition	Mean	Std. Dev.	Min	Max	Type	Related Hypothesis	Analytical Framework
AGE	Age of the network	23.63163	21.70479	0	205	Quantitative variable	*H1: The integration level differs because the sectors do not have the same maturity*	Theory of signal
RETAILSER	Retail *versus* Services (0/1)	0.28651163	0.73885337	0	1	Dummy variable	*H2: The integration level differs because the sectors do not have the same constraints*	Capital constraints
SIZE	Size of the network : Number of outlets in France	113.848372	259.232232	7	60.55	Quantitative variable	*H3: the sectors are more or less composed of heterogeneous units*	Agency theory
K-MARK	Proxy variable for the involvement of the upstream firm	7.169302	4.29143	0	12	Multinomial ordered variable	*H4: The integration level differs because the involvement of the upstream firm is different among sectors*	Transaction costs theory Agency theory

The proxy variable K-MARK is constructed with six qualitative variables. Each of them has been re-coded from 0-2 (0 = no, 1 = yes partially, 2 = yes totally): the higher this variable, the higher the involvement of the upstream firm in the vertical relationship.

Table 8 - Construction of the proxy variable K-MARK

Aggregation of the six following qualitative variables :
Design of the retail outlet
Teams training
Launch of advertizing and promotion
Definition of offered services to customers
Sales tracking
Spreading information concerning the performance of retailers in the network
For information : minimum : 0 maximum : 12

IV.4. Control variables

The three control variables presented in table 9 are included in the models.

Considering that the type of product characterizing the sector may explain some organizational choices, the variable PRODUCT is constructed taken into account the distinction of two kinds of products: banal versus anomal (table 10).

Two structural variables control for the influence of a mono versus a multi network(s) upstream firm (MOMUL) and of a financial control of the upstream firm by the network members (CONTRO).

Table 9 - Control variables

Variable	Definition	Type
PRODUCT	Type of product : banal/anomal (0 /1)	Dummy variable
MOMUL	The upstream firm has only one versus several networks (0/1)	Dummy variable
CONTRO	Control of the head by network members	Dummy variable

Table 10 - Construction of the proxy variable PRODUCT

BANAL (432 networks)	ANOMAL (643 networks)
Low costs Automatic purchase High frequency purchase	High costs Well-thought-out purchase High research costs

V. Estimations

We estimate the three following econometric models to study the influence of the sector-based explanations i) on the integration rate (linear regression [1]), ii) on the binary choice for an integrated network versus a mixed network (probit model [2]), iii) on the dominant type of organization (ordered probit model [3]). Sector dummies are included.

Equation for the integration rate:

$$OWNEDRATE_i = \alpha_0 + \alpha_1 AGE_i + \alpha_2 RETAILSER_i + \alpha_3 SIZE_i + \alpha_4 KMARK_i + \alpha_5 PRODUCT_i + \alpha_6 MOMUL_i + \alpha_7 CONTRO_i + \sum_{s=1}^{23} \alpha_8 SECTOR_i + \varepsilon_i \quad [1] \quad i = \{1, \ldots, 1075\}$$

Equation for the choice "integration versus alternative vertical organization":

$$prob\,(INTEGRETED_i = 1 | Xi) = \alpha_0 + \alpha_1 AGE_i + \alpha_2 RETAILSER_i + \alpha_3 SIZE_i + \alpha_4 KMARK_i + \alpha_5 PRODUCT_i + \alpha_6 MOMUL_i + \alpha_7 CONTRO_i + \sum_{s=1}^{23} \alpha_8 SECTOR_i + \varepsilon_i \quad [2] \quad i = \{1, \ldots, 1075\}$$

Integration level of the network:

$$NETYPE^*_i = \alpha_0 + \alpha_1 AGE_i + \alpha_2 RETAILSER_i + \alpha_3 SIZE_i + \alpha_4 KMARK_i + \alpha_5 PRODUCT_i + \alpha_6 MOMUL_i + \alpha_7 CONTRO_i + \sum_{s=1}^{23} \alpha_8 SECTOR_{i\,i} + \varepsilon_i \quad [3] \quad i = \{1, \ldots, 1075\}$$

where $NETYPE^*$ = latent variable denoting the integration level of the network
and $NETYPE$ = observed variable: organizational form of the network *ie* type of dominant contract

with	$NETYPE = 0$	Groupment
	$NETYPE = 1$	Franchised network
	$NETYPE = 2$	Integrated network

The estimation results are reported in tables 11 and 12 (see also appendix 2).

Table 11- Estimation results (1)

	(1) OLS	(2) Probit	(3) Oprobit
AGE	0.00350***	0.0132***	0.0116***
	(0.000516)	(0.00316)	(0.00281)
RETAILSER	-0.0241	-0.231	0.121
	(0.0480)	(0.154)	(0.148)
SIZE	-0.000244***	-0.00120***	-0.00125***
	(0.0000714)	(0.000343)	(0.000281)
KMARK	0.0213***	0.0644***	0.0716***
	(0.00433)	(0.0138)	(0.0138)
PRODUCT	-0.0556*	-0.205*	-0.333***
	(0.0244)	(0.0831)	(0.0754)
MOMUL	-0.0467	-0.110	-0.233
	(0.0351)	(0.119)	(0.120)
CONTRO	0.0422**	0.103*	0.258***
	(0.0142)	(0.0463)	(0.0464)
Sector dummies	*no*	*no*	*no*
_cons	0.450***	-0.259	
	(0.0690)	(0.229)	
cut1			
_cons			-0.922***
			(0.234)
cut2			
_cons			0.371
			(0.231)
Prob > F or chi2	0.0000	0.0000	0.0000
R^2 or Pseudo R^2	0.1455	0.1236	0.1041

Standard errors in brackets
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The good global significance level of the three models (Fisher or Chi 2 probabilities) suggests that the analytical framework is relevant.

In the majority of cases the results are qualitatively similar (significance and sign of the parameters) in the three models. This enables to conclude for robustness.

Three of the four core explanatory variables have a significant impact on the organizational choices. As predicted by the explanation in terms of signal theory *(H1)*, the maturity of the network has a positive significant influence on the integration level: integration rate, choice for an integrated network, dominant contract type in the network from the less integrating to the more integrating. This result is reverse to the prediction from the explanation in terms of capital constraint. This is consistent with the estimates relating to the variable RETAILSER *(H2)* whose influence is only significant in the probit and ordered probit models table 12. Consistent with the explanation from the agency theory *(H3)*, the size of the network impacts negatively the level of network integration. As predicted, the mix of different types of vertical contracts within a same distribution network appears to be related to a high number of outlets. Finally, the hypothesis related to the brand-name value deriving from the transaction costs and the agency theories *(H4)* finds also an empirical support here. The involvement of the upstream firm influences positively the network integration level.

Concerning the control variables, the variable PRODUCT, directly related to a sector-based explanation, has a significant influence in all the estimations except in the probit model table 12. The variable MOMUL has no significant impact; this is the reverse with the variable CONTRO whose positive influence suggests that the control of the upstream firm by the network members is related with the most integrated vertical systems.

The models are estimated twice, without (table 11) and with (table 12) sector dummies. Appendix 2 presents the detailed results including the sector dummies. In the three models the estimation results are robust, but the global significance (R^2) is clearly higher when they include sector dummies, suggesting that the sector-based explanation is relevant. The sector influence involves that the variable PRODUCT is not enough (far from it in view of the significance levels) to justify the integration choices. The explanation would be more in the nature of the product or service being sold. On the other hand, the impact of the sector dummies shows that some characteristics related to the integration behaviors are not analyzed by the theory of contracts. For example, logistics, supply, computer links needed between outlets (etc.) are, indirectly, but only taken into account by means of the sector. The observed diversity of the organizational choices between the sectors would not only be explained by the differences between the networks that constitute the sectors (in terms of age, size, involvement of the upstream firm, control of the upstream firm by the retailers), but also because the sectors themselves are different.

Table 12- Estimation results (2)

	(1) OLS	(2) Probit	(3) Oprobit
AGE	0.00281***	0.0110***	0.0082***
	(0.000547)	(0.00234)	(0.00211)
RETAILSER	-0.1399	-1.1803***	-0.866**
	(0.076)	(0.326)	(0.308)
SIZE	-0.000272**	-0.00038**	-0.000073**
	($9.61e^{-6}$)	(0.000118)	(0.000028)
KMARK	0.0201***	0.0632***	0.0718***
	(0.00403)	(0.0147)	(0.0134)
PRODUCT	-0.172*	-0.456	-0.826**
	(0.082)	(0.298)	(0.251)
MOMUL	-0.0517	-0.096	-0.231*
	(0.0340)	(0.126)	(0.115)
CONTRO	0.0455**	0.120*	0.278***
	(0.01347)	(0.0497)	(0.0454)
Sector dummies[1]	*yes*	*yes*	*yes*
_cons	0.642***	0.686*	
	(0.0804)	(0.349)	
cut1			
_cons			-1.950***
			(0.333)
cut2			
_cons			-0.604
			(0.330)
Prob > F or chi2	0.0000	0.0000	0.0000
R^2 *or Pseudo* R^2	0.2235	0.2039	0.1436

Standard errors in bracket
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[1] See appendix 2 for detailed estimations.

VI. Conclusion

Based on recent data concerning the French distribution networks in retail and services, this paper highlights several stylized facts relating to the sector-based differences in the organizational choices. Until now this issue has not been studied in the economical literature.

This paper provides an analytical framework derived from the theory of contracts, and evidence for the French case with three econometrical models concerning the contract-mix and the networks integration levels. The estimations show that the maturity of the sectors, the level of heterogeneous local conditions, the degree of involvement of the upstream firm as well as the type of product are part of the explanation for the sector-based differences in the organizational choices. However the paper highlights also some limitations in the explanations deriving from the economic theory.

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APPENDIX 1

In INSEE's surveys, nine kinds of relationship between outlets and the upstream firm are considered (from most integrated to most independent):

- Integrated outlets which belong to the upstream firm or to one's subsidiary;
- Franchising outlets;
- Outlets with licence brand contract;
- Outlets with commission-based affiliation contract;
- Outlets with concession contract;
- Outlets with lease-management contract;
- Outlets member of central buying service or central referencing service which do not have the brand name of the network;
- Outlets member of groupment;
- Outlets with other relationships.

Several networks usually have distinct relationships with their different outlets. In order to characterize these different relationships inside each network, the INSEE allocates to each network a type according to the share of turnover realized by each kind of outlets. The different kinds of network are given in the following table; the algorithm tests successively the condition in the second column of the table and stops as soon as a condition is true.

Table appendix 1: The different kinds of network

Kind of network	Conditions
Completely integrated	100 % of turnover is realized by integrated outlets
Mixed highly franchised	More than 50 % of turnover is realized by franchising outlets
Mixed lightly franchised	Between 20 % and 50 % of turnover is realized by franchising outlets
Predominantly integrated	More than 50 % of turnover is realized by integrated outlets
Groupment	More than 50 % of turnover is realized by outlets member of groupment
Brand Licence	More than 50 % of turnover is realized by outlets with brand licence contract
Commission-based affiliation	More than 50 % of turnover is realized by outlets with commission-based affiliation contract
Concession	More than 50 % of turnover is realized by outlets with concession contract
Other	Other networks

APPENDIX 2

	(1) OLS	(2) Probit	(3) Oprobit
AGE	0.00281***	0.0110***	0.0082***
	(0.000547)	(0.00234)	(0.00211)
RETAILSER	-0.1399	-1.1803***	-0.866**
	(0.076)	(0.326)	(0.308)
SIZE	-0.000272**	-0.00038**	-0.000073**
	($9.61e^{-6}$)	(0.000118)	(0.000028)
KMARK	0.0201***	0.0632***	0.0718***
	(0.00403)	(0.0147)	(0.0134)
PRODUCT	-0.172*	-0.456	-0.826**
	(0.082)	(0.298)	(0.251)
MOMUL	-0.0517	-0.096	-0.231*
	(0.0340)	(0.126)	(0.115)
CONTRO	0.0455**	0.120*	0.278***
	(0.01347)	(0.0497)	(0.0454)
Travel agencies[2]	*0.377****	*1.395***	*1.3537****
	(0.1074)	*(0.4052)*	*(0.3588)*
Other services activities	*0.078*	*0.4052*	*0.5426*
	(0.1148)	*(0.3999)*	*(0.3502)*
Real estate agencies	*0.0265*	*0.4629*	*0.6087**
	(0.0946)	*(0.3439)*	*(0.2892)*
Renting (motor vehicles, personal goods)	*0.1221*	*0.4047*	*0.5640*
	(0.1129)	*(0.4026)*	*(0.3411)*
Information technology and computer service activities	*0.066*	*0.0151*	*0.2439*
	(0.1562)	*(0.5672)*	*(0.4719)*
Other business service activities	*0.1311*	*0.4996*	*0.6603***
	(0.0831)	*(0.2973)*	*(0.2532)*
Maintenance and repair of motor vehicles and sale of motor vehicle parts and accessories	*-0.1627*	*-1.1113**	*-0.8221*
	(0.1332)	*(0.5061)*	*(0.4555)*
Large-scale food retailing stores	*-0.0995*	*-0.7155*	*-0.8699**
	(0.0960)	*(0.4055)*	*(0.3834)*

[2] The sectors "Accommodation" and "Food and beverage" are regrouped for these estimations and serve as a reference for the service activities; the sector "Shoe stores" is the reference for retail.

Personal service activities	*-0.3658**** *(0.0672)*	*-1.1756**** *(0.2787)*	*-0.6622**** *(0.2027)*
Personal and household goods	*-0.1391* *(0.1025)*	*-0.8700** *(0.4134)*	*-0.7442** *(0.3732)*
Cultural and recreation goods stores	*-0.1413* *(0.1069)*	*-0.9017** *(0.4274)*	*-0.7898** *(0.3855)*
Home equipment stores	*-0.1451* *(0.1038)*	*-1.1475*** *(0.4161)*	*-0.8610** *(0.3754)*
Do-it-yourself stores and flower stores	*-0.3390**** *(0.0664)*	*-1.4790**** *(0.3020)*	*-1.6412**** *(0.2884)*
Department and general stores	*0.0309* *(0.1463)*	*-0.0244* *(0.6726)*	*0.3383* *(0.6403)*
Small-scale food retailing stores and frozen products stores	*-0.4220**** *(0.1104)*	*-1.4457*** *(0.4377)*	*-1.7117**** *(0.3978)*
Retailing craft industry	*-0.2856*** *(0.1009)*	*-1.6827**** *(0.3963)*	*-1.4147**** *(0.3686)*
Sale, maintenance and repair of motorcycles	*-0.3993** *(0.1927)*	*-1.8043** *(0.7286)*	*-1.1756** *(0.6053)*
Retail sale of food, beverages and tobacco in specialized stores	*-0.2640**** *(0.0742)*	*-1.3530**** *(0.3205)*	*-1.3250**** *(0.3104)*
Other sundry specialized retail sale	*-0.0215* *(0.1047)*	*-0.7105* *(0.4205)*	*-0.4545* *(0.3814)*
Clothes stores	*-0.1023** *(0.0531)*	*-0.5779** *(0.2741)*	*-0.6716** *(0.2672)*
_cons	0.642*** (0.0804)	0.686* (0.349)	
cut1 _cons			-1.950*** (0.333)
cut2 _cons			-0.604 (0.330)
Prob > F or chi2	0.0000	0.0000	0.0000
R^2 or Pseudo R^2	0.2235	0.2039	0.1436

Standard errors in brackets
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$